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DEPARTMENT OF AGRICULTURE.

ALBUM  
OF  
AGRICULTURAL GRAPHICS.

VALUES PER ACRE OF CROPS OF THE UNITED STATES,

BASED ON RESULTS OF OFFICIAL STATISTICAL INVESTIGATION.

BY J. R. DODGE, STATISTICIAN.

PUBLISHED BY THE COMMISSIONER OF THE SECRETARY OF AGRICULTURE.



WASHINGTON, D. C.

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## LETTER OF SUBMITTAL.

DEPARTMENT OF AGRICULTURE,  
OFFICE OF THE STATISTICIAN,

June 16, 1891.

SIR: The publication of the ALBUM OF AGRICULTURAL STATISTICS elicited the warmest expressions of popular appreciation from teachers in educational institutions of all grades, directors of Farmers' Institutes, and the intelligent public generally. The subjects selected were recognized as of paramount importance and suited to the methods of illustration adopted, which were direct and simple and well calculated to afford a clear and distinct understanding, avoiding the common defect of confused and involved ideas in graphic illustration.

The ALBUM OF AGRICULTURAL GRAPHICS, issued last year, presented the important topic of values per acre, on the basis of average farm value, as reported on the first of December for each year. The new publication met with equal favor, and the present edition of 20,000 copies is issued in response to demands of public educators and others interested in said statistics.

The values of crops in any single year would not be just as a record of comparative values, because of the great variation in quantity from year to year; therefore the average of ten consecutive years is made the basis of comparison, securing an absolutely fair result, for which no data can be found except in the annual estimates of values of farm products of this Department, which are accepted as the most accurate and reliable of the work of our crop reporters.

The series includes ten maps, each illustrating values of a single crop, by States, the whole comprising the entire list of farm products for which annual estimates in detail of area and rate of yield and value have been made. The following is the

### LIST OF ILLUSTRATIONS.

- |  |  |
|--|--|
| I. Corn, values and yields per acre.   | VI. Buckwheat, values and yields per acre. |
| II. Wheat, values and yields per acre. | VII. Potatoes, values and yields per acre. |
| III. Oats, values and yields per acre. | VIII. Tobacco, values and yields per acre. |
| IV. Rye, values and yields per acre.   | IX. Cotton, values and yields per acre.    |
| V. Barley, values and yields per acre. | X. Hay, values and yields per acre.        |

In this plan of illustration the main idea, that of value, is presented geographically in an outline map of the United States, the differentiation being shown both by the density of color and distinct peculiarity of mechanical drawing, by groups of States, while the differences within these groups are seen in the table of State averages on the margin. As a prominent element of value per acre, the yield per acre is conspicuously indicated on the field of each State, as well as in the marginal table. Of course, the other element is value per unit of quantity, which is in some crops almost as important as rate of yield.

The economic suggestion in the facts illustrated is rich and of highly practical value to the American farmer. It may prove useful as well as interesting to inquire why an acre of corn is worth four times as much in one State as in another, an acre of wheat three times as much, and an acre of oats twice as much. It may also be worth inquiry why the average yield of corn per acre for ten years is 32.7 bushels in New Hampshire, which possesses a granitic soil, which is so far removed in fertility from the ideal maize-bearing alluvium, and only 26.7 bushels in Illinois, which is endowed with extraordinary fertility. As price as well as yield is an element in value per acre, a luminous economic vista is opened by the inquiry why the price per bushel should be more for one bushel in one State than for three in another. Farmers will never be as prosperous as they should be until they act in the light of the knowledge derived from the solution of the problems involved in the differentiation of yield and price.

Respectfully,

J. R. DODGE, *Statistician*.

HON. J. M. RUSK, *Secretary*.



# ALBUM OF AGRICULTURAL GRAPHICS.

## VALUES PER ACRE OF FARM CROPS.

The geographical method is found convenient in this comparison of values per acre. Valuation by acre of cultivation, rather than by unit of measurement, is the more important consideration, practically and economically. There is far greater variation, in current agricultural practice, in the cost per bushel of product than in the cost per acre of cultivation and harvesting. The relation between superficial area and value of product is therefore vital and controlling, and is naturally selected as the main idea in the plan of illustration here adopted. The yield per acre, however, is the more important of the two elements which combine to make values, representing quantity of production, the other being of course, value per unit of measurement. It is proper, therefore, that differences in State averages of yield should be prominently indicated. This is done in a manner that does not confuse in the least the two ideas of value by area and by quantity of product, the latter being an important factor in producing the value per acre. The average yield per acre of each State is shown in plain figures in a circle of color different from the main tint.

An examination of the national averages, of ten consecutive crops, shows a wide range of value per acre. Tobacco has the highest average, \$61.51. That of potatoes is \$38.34. Cotton, the third in order, drops to \$15.69. Hay makes an average of \$11.08. The cereals fall below \$10 per acre, excepting only barley, which is not grown in sufficient quantity to meet the requirements of consumption, and averages \$12.76 per acre, 28 per cent. more than the average of wheat for the same period. The average for corn is \$9.47; that of rye \$8.27; of buckwheat, \$8.24; of oats, \$8.16.

The cost of cultivation and harvesting is considerable in tobacco and in potatoes, yet the opportunity for larger net returns for superintendence

and use of land is greater in the case of large gross returns per acre. Considering the cost of picking and ginning, as well as the labor of cultivation, the value of cotton per acre is not greatly in excess of that of cereals. The value of cereals suggests an excess of breadth cultivated and a minimum of labor in cultivation, which accounts for the low yields and small net profits. It indicates the fact that the era of intensive culture awaits the scarcity and appreciating value of fresh lands. The extremes in value per acre of corn are \$24.32 and \$6.19. Eighteen States and Territories average above \$15. Half of these are east of the Alleghanies and north of Delaware; the other half on the Pacific Coast and in the Rocky Mountain region. In the former the cause is found in large yield and high prices, both the result of demand for consumption by a large proportion of the population engaged in non-agricultural industries. In the latter the climate is not so well suited to maize, and mining and manufacturing stimulate demand. Where prices are lowest there is either an excessive production or a very low rate of yield. It requires nearly four acres in South Carolina to equal the value of one in New Hampshire, though the soil of the former is superior to that of the latter; and it requires more than three acres in Nebraska, which makes the highest average rate of yield, to produce the value of one in the Granite State. These diverse results depend far more upon inequalities in distribution of population, and especially in the ratio of consumers to producers, than upon climate or soil. In wheat and other cereals, potatoes, hay, and all farm products of general geographical distribution, similar differences are found to result from similar causes.

The tabulations of rate of yield per acre make the following averages for ten years, which are

stated in connection with averages of value per acre:

	Value.	Yield.		Value.	Yield.
Corn.....bush..	\$9 47	24.1	Buckwheat..bush..	\$8 24	12.8
Wheat..... " ..	9 95	12.0	Potatoes..... " ..	38 34	76.2
Oats..... " ..	8 16	26.6	Tobacco...pounds..	61 51	727.1
Rye..... " ..	8 27	11.9	Cotton..... " ..	15 69	168.1
Barley..... " ..	12 76	21.7	Hay.....tons..	11 08	1.19

The past decade has been marked by several years of drought, which have reduced the rate of yield below the average of the preceding decade, a period comparatively exempt from dry seasons. The years of sufficient rainfall show no diminution of rate of yield.

The value per acre of corn in the New England States ranges from \$24.32 in New Hampshire to \$20.94 in Connecticut—more than twice the general average. New York, New Jersey and Pennsylvania, producing far less than their consumption, are nearer the source of supply, reducing value to about \$18 per acre. The Western mountain areas, in which corn is very sparsely grown on the lower elevations, require a supply from the Central States, increasing the cost, through freight and commissions, nearly to a level with values in the Middle States, the range of price depending upon accessibility of the local centers of consumption. In the Ohio Valley the State averages are somewhat higher than the national average, except in Illinois; and in the Missouri Valley, the region of commercial surplus, prices are necessarily lower than the general average. In Maryland and Virginia, and also in Louisiana and Arkansas, prices are above the national average, but below it in the other Southern States, the supply being nearly equal to requirements, grown on a superficially cultivated area of cheap lands and, therefore, at a



low rate of yield. With increase of mining and manufacturing, prices per bushel and yields per acre will increase.

The higher values per acre in wheat are found in the Eastern States. Colorado, by reason of demand and rate of yield, makes an exceptionally high average. The Middle States and the Rocky Mountain districts generally make relatively high averages. The entire Northwest runs below the general average, and also the entire Cotton States, in the former case because of supply beyond consumption, and in the other because of low rate of yield. While the South has some climatic disadvantage in the production of cereals, there are soils and situations well adapted to production of winter grain in nearly every State, and especially in those having considerable areas above tide-water and elevations assuring a temperate climate. There is no difficulty in producing ample supplies of all the cereals throughout the South. The average rate of yield for the country, 12 bushels, is nearly the same as that of Europe. England, with a small acreage, has an average more than twice as large, while Russia, with a large breadth, averages scarcely two-thirds as much as the United States. As population shall increase, higher cultivation and soil enrichment will follow as a necessity. This result is beginning to be seen in the practice of the most progressive wheat growers, and is shown in the differences of State averages. Even the exceptional richness of the western prairies is fully offset by the fertilization and cultivation of relatively poor soils of the Atlantic Coast. In this way the wants of a population of more than 100,000,000 people should be met by a breadth of wheat no larger than that of the present year.

The range of value per acre of oats is from \$18.15 in Nevada to \$4.56 in North Carolina. In the South the crop can only be grown in winter, and the average yield is reduced by the custom of growing more for winter grazing than for seed. Very heavy yields are sometimes made in the lower latitudes, with proper selection of seed and soil and with favorable meteorological conditions. The principal breadth in oats is in the States of the Northern border. The plant requires a moderate temperature. The first group producing the higher

values per acre comprise Washington, Idaho, Colorado, Montana, Nevada, Massachusetts and New Hampshire. The increase in the area of oats has been extraordinary, the breadth doubling in little more than a decade. This is due to enlarged requirements for horse feeding, an exclusive ration of corn proving too stimulating in our climate, and to more extensive use for human food.

Rye is a crop for poor soils and is not much grown in this country. The first group has a range of value from \$12.78 to \$11.17, the lowest from \$5.51 to \$4.67. The average yield in the South is lower by reason of the fact that it is grown more for winter pasture than for seed.

Barley has a higher value per acre than any other cereal, the first group having a range of \$20.47 to \$17.43 per acre. The lowest has a value from \$9.65 to \$7.59 per acre. The highest value per acre is in Maryland, where the yield averages 25.5 bushels under fertilization and generally good cultivation. The highest average yield is 29.1 bushels in Washington. Still a large quantity is annually imported on account of the proximity of Canada to the great beer-manufacturing centers, and of the high malting quality of the Canada product. Its distribution is by no means general, as California, Wisconsin, Minnesota and New York are the main factors of its production, producing half of the crop. Dakota, Iowa, and Nebraska contribute largely to the supply, the remaining States having scanty and scattered areas.

Buckwheat is by no means a general crop, the larger portion being grown in New York and Pennsylvania. The highest average value per acre is \$15.69, in California.

The average value per acre of potatoes is \$38.34, and the average yield 76.2 bushels. Like oats, the potato is adapted to cool climates of the higher latitudes. The range of yield is from 117 to 55 bushels, and the average value per acre from \$76.25 to \$30.49.

The value per acre of tobacco is relatively high, with a very wide range, from \$204.28 to \$44.24 per acre. The highest yields and prices per pound are for seed-leaf tobacco, used exclusively for cigars, and grown solely in the Northern States, and mainly in a few counties on the Connecticut River,

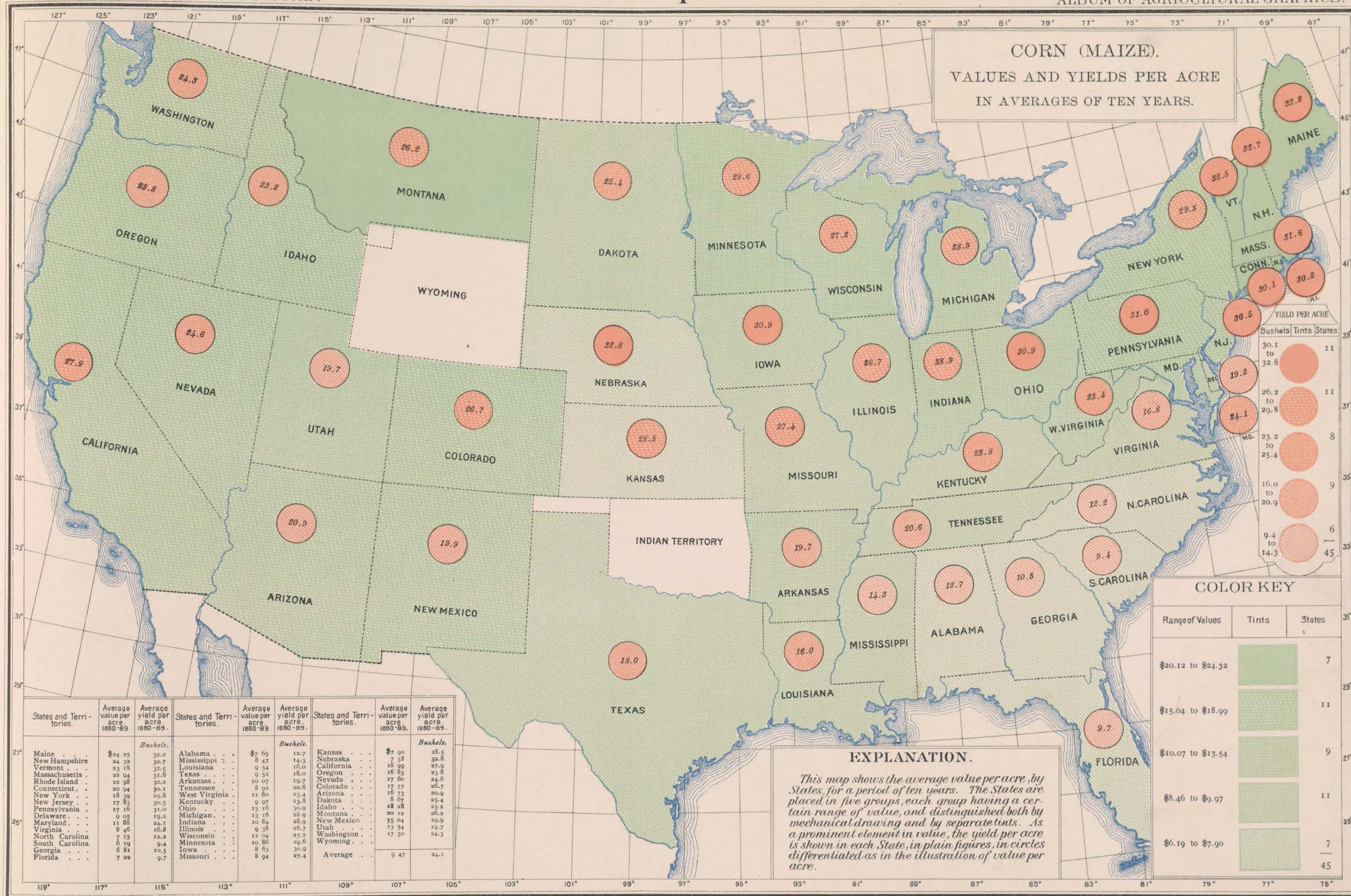
three in New York, three in Pennsylvania, and in limited districts in Wisconsin and Ohio. The latter State also produces tobacco for manufacture of plug, fine-cut and other products, and averages a value of \$66.28 per acre. Kentucky, the principal producer of manufacturing and shipping tobaccos, averages \$58.63; Virginia, \$44.85; Maryland, \$44.24. North Carolina, famous for bright wrappers, has an average of \$51.21.

The value of cotton per acre runs from \$20.83 to \$11.16. The yield per acre is highest in Louisiana, averaging 232.7 pounds of lint, and lowest in Florida, averaging 106.4 pounds, a part of which is sea-island cotton, which has a high relative value. Arkansas, Mississippi, Texas, and Tennessee follow Louisiana in the order of value, while Louisiana, Arkansas, Texas, Mississippi, and Tennessee follow in the order of yield. The cost of transportation, commissions and compressing, and other charges add materially to the value at the ports of exportation.

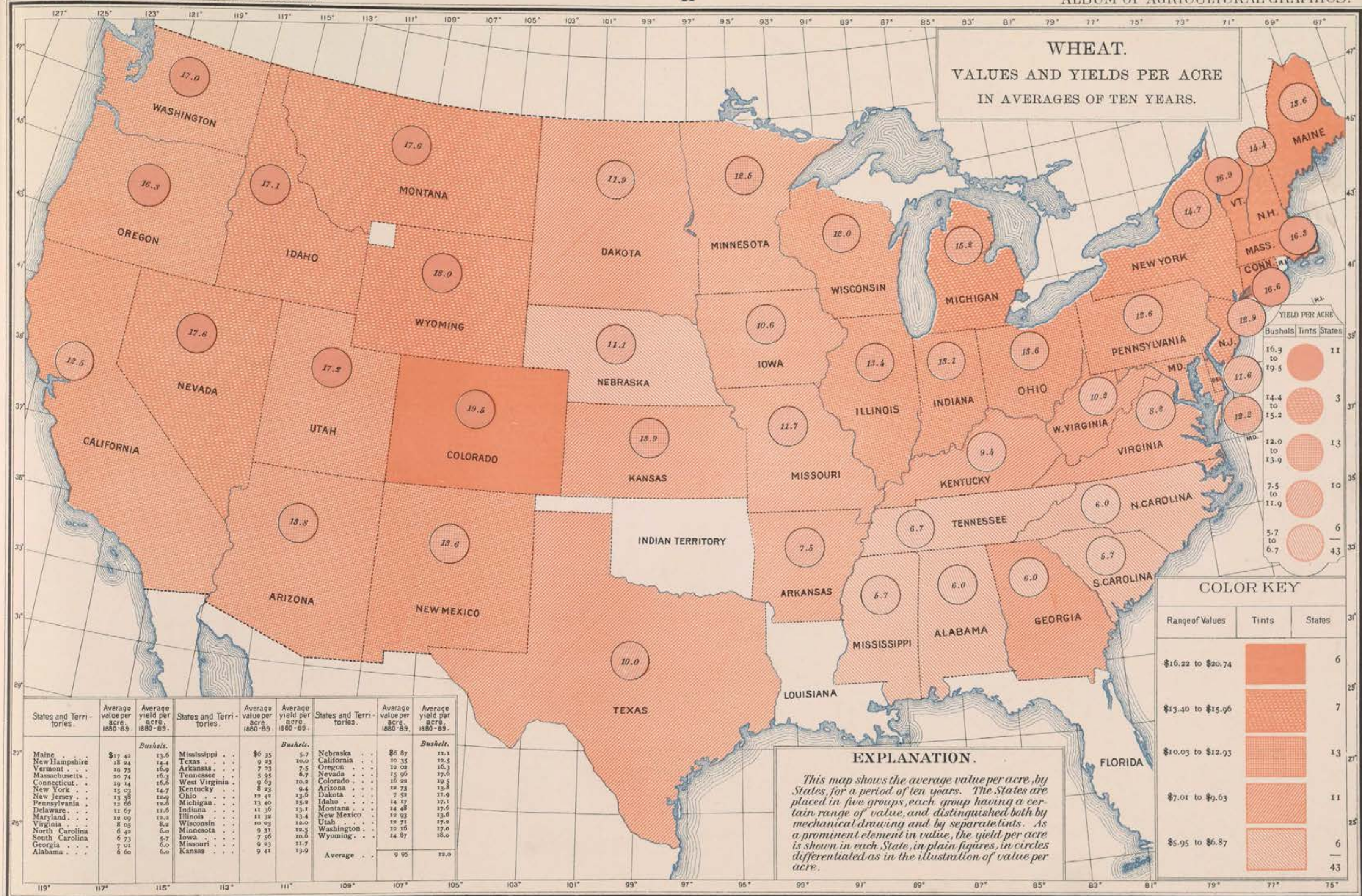
There is a great difference in the State values of hay. Massachusetts has naturally the highest average, \$18.82 per acre, having the fewest numbers engaged in agriculture in proportion to the whole population, and therefore the largest relative demand. Nebraska has the smallest average value, \$4.82, as large areas of grass are had for little more than the cost of cutting. It has been relatively high in the South, because grass has been deemed inimical to agriculture under the cotton régime, and not generally tolerated; but a marked change is progressing, which will greatly increase and may cheapen the product.

The yield per acre is an important element in value per acre, but not the only one. The price per pound or bushel also differs, owing to distance from market and local scarcity or abundance. The tendency of railroad extension is toward equalization of prices, yet the difference in State averages of price shows how great differentiation in price still exists. It naturally happens that where prices are low yields are also low from lack of inducement to high culture, intensifying the disparity in values per acre. A study of these differences may surprise the casual reader and may prove fruitful of practical suggestions if made with care and thoughtfulness.

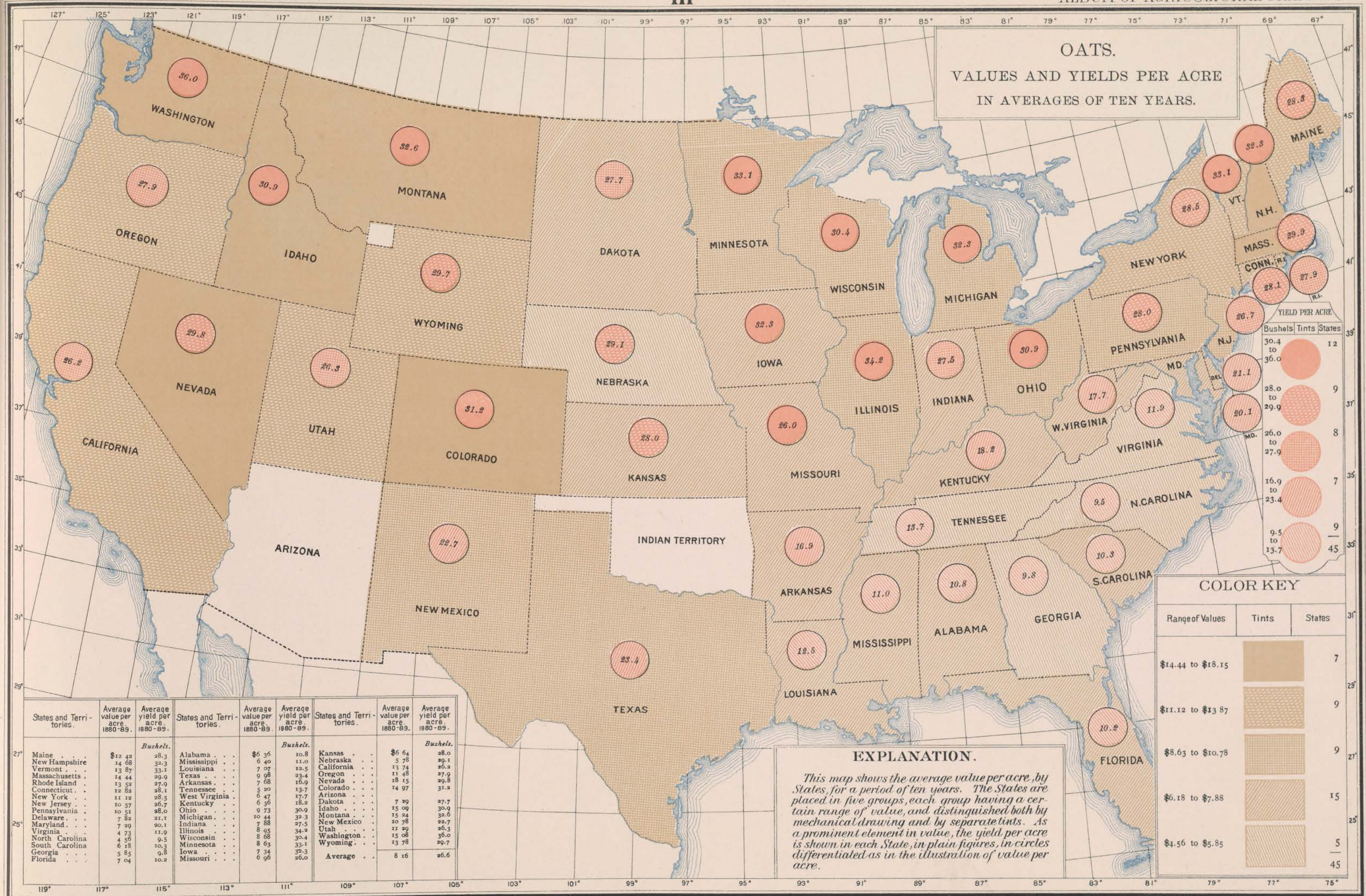




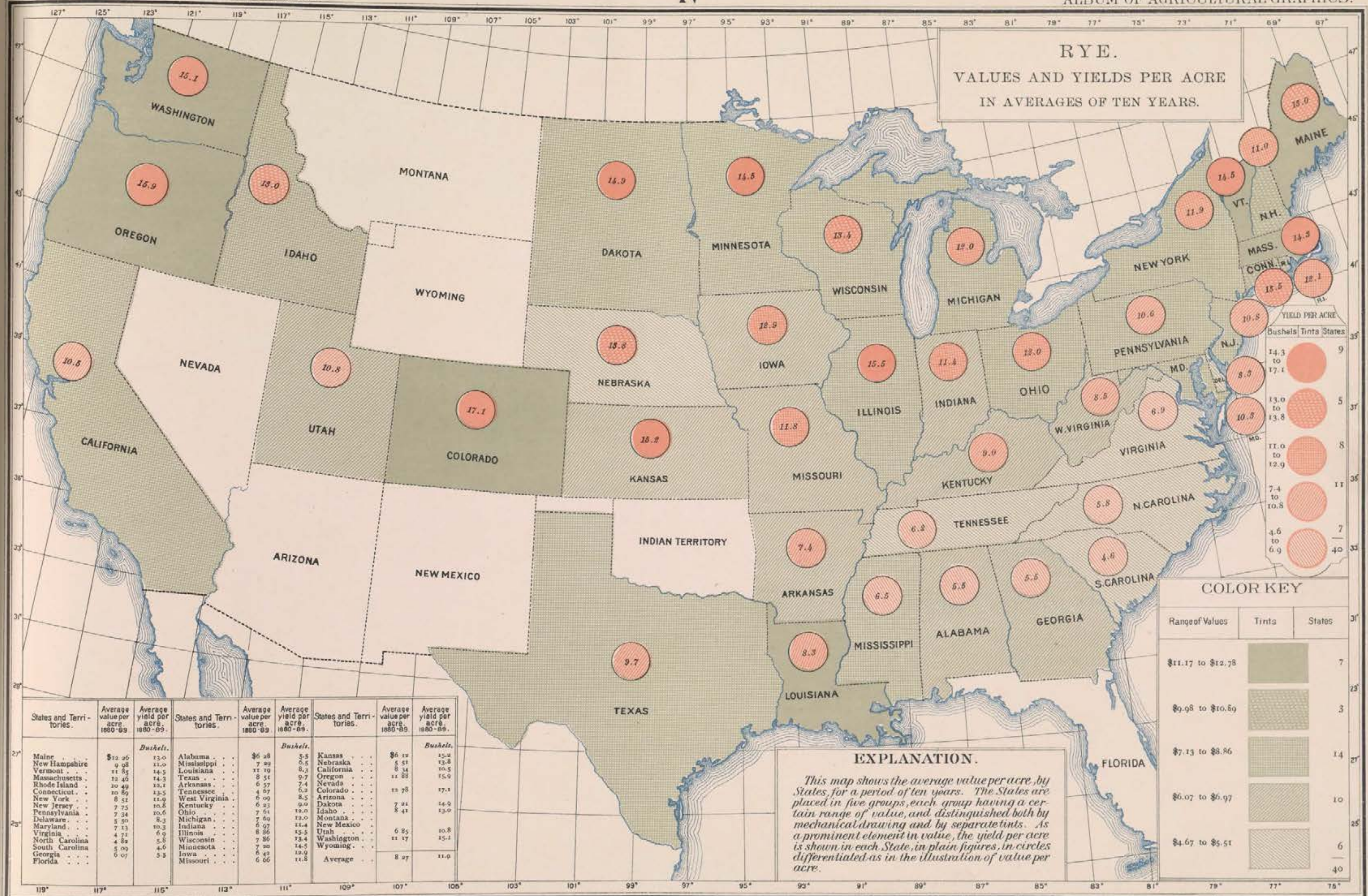






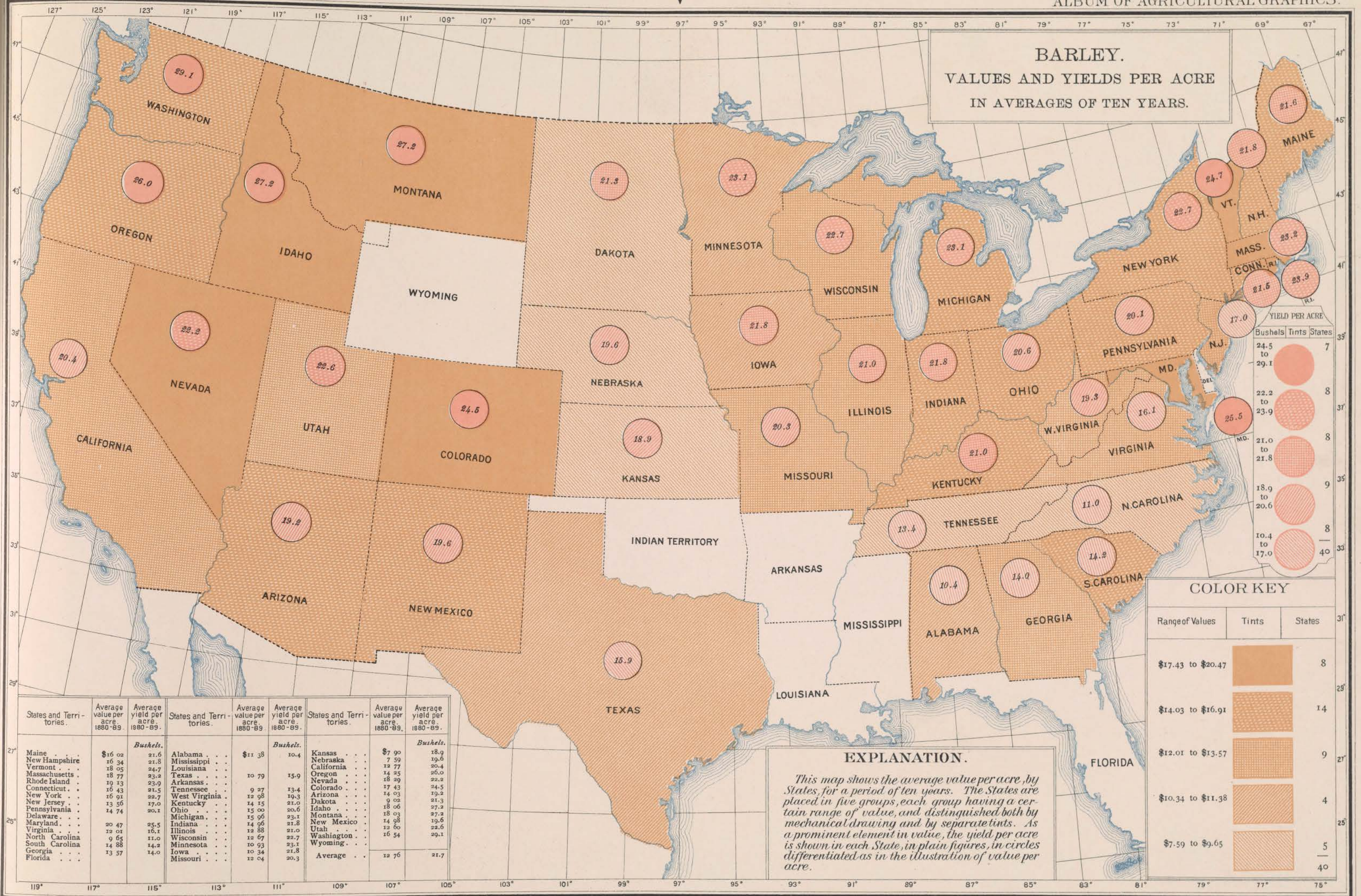




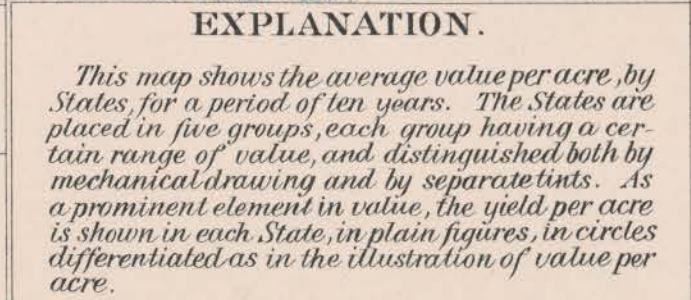




BARLEY.  
VALUES AND YIELDS PER ACRE  
IN AVERAGES OF TEN YEARS.

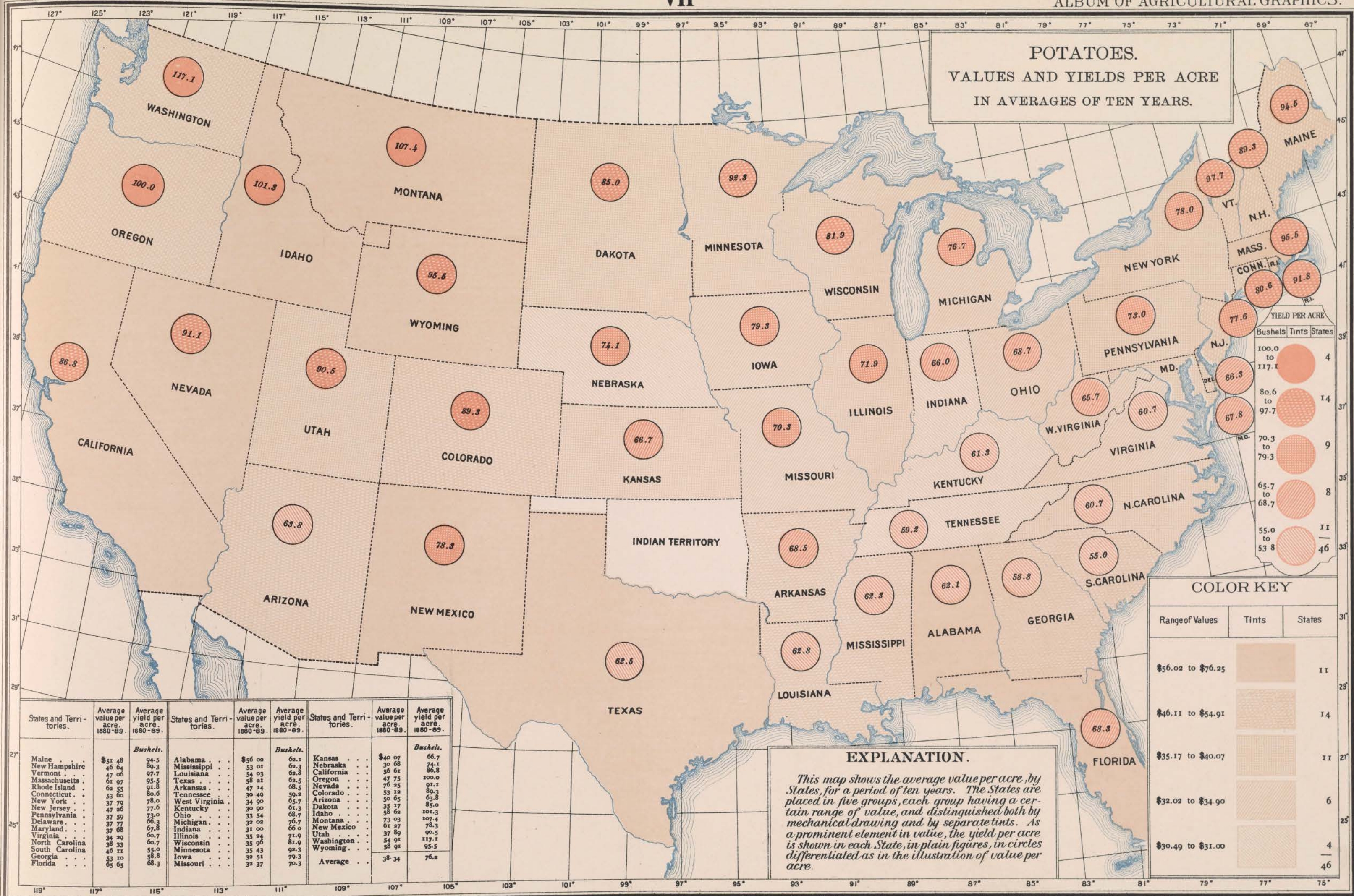








POTATOES.  
VALUES AND YIELDS PER ACRE  
IN AVERAGES OF TEN YEARS.



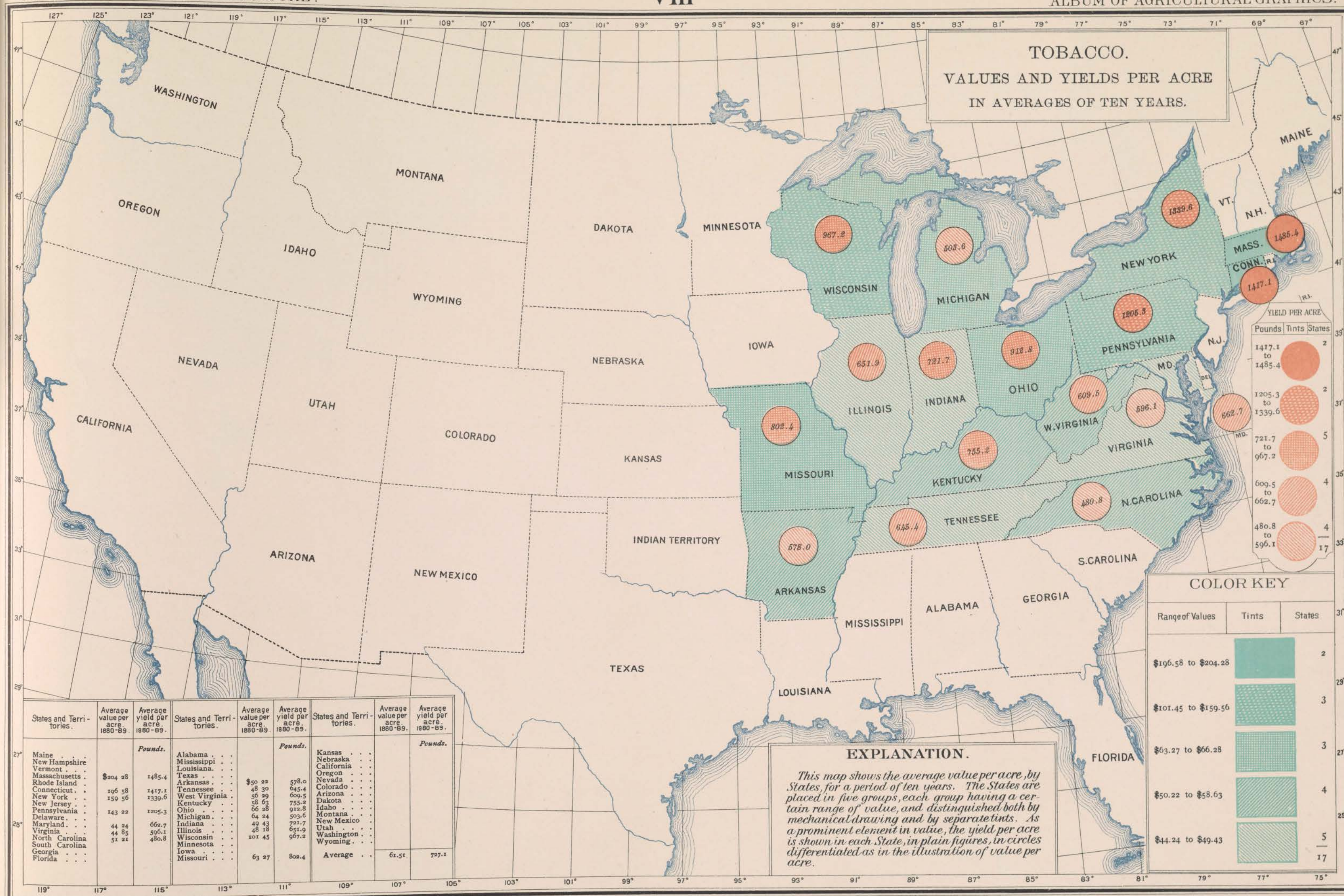
COLOR KEY

Range of Values	Tints	States
\$56.02 to \$76.25		11
\$46.11 to \$54.91		14
\$35.17 to \$40.07		11
\$32.02 to \$34.90		6
\$30.49 to \$31.00		4
		46

EXPLANATION.

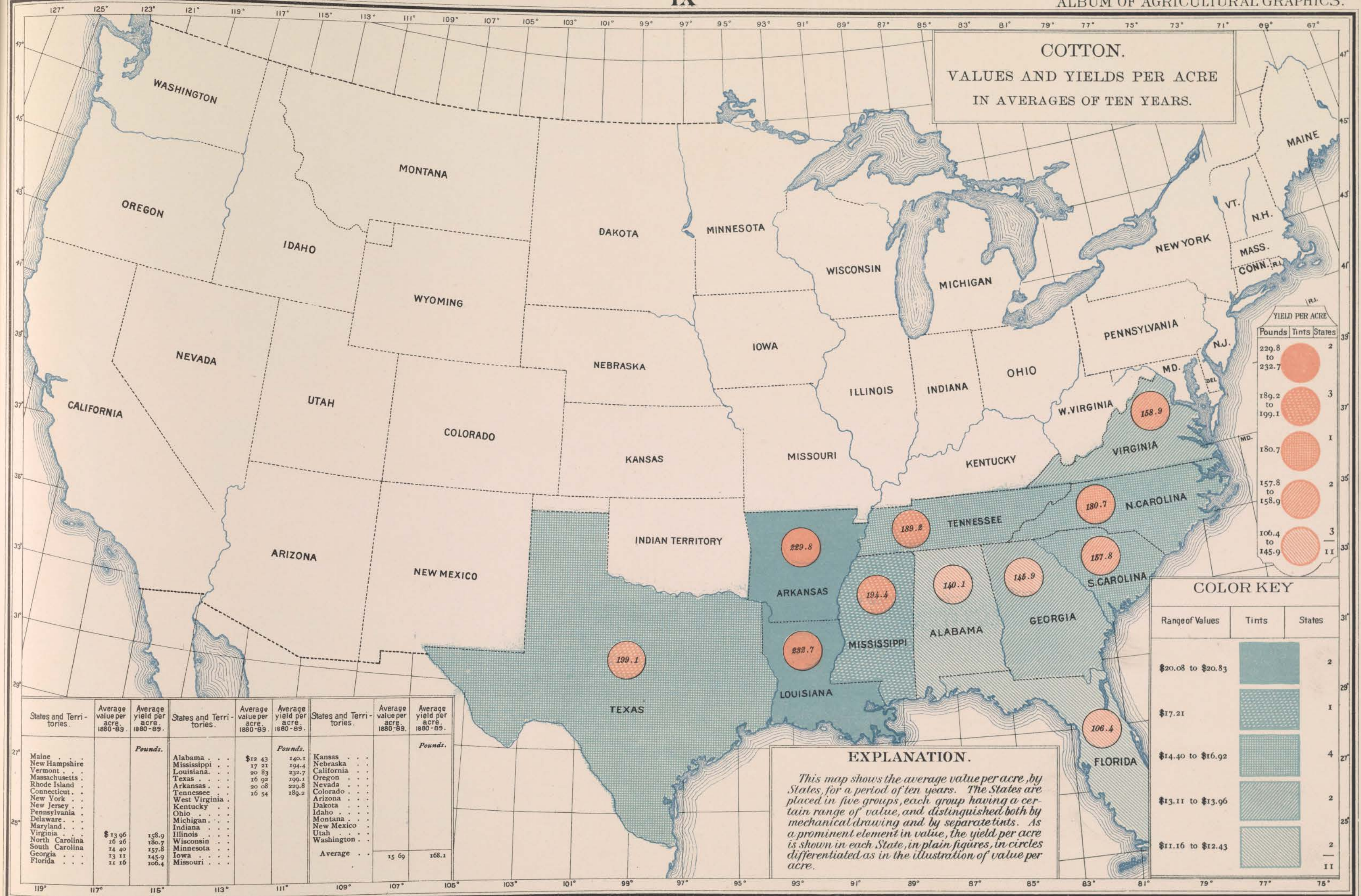
This map shows the average value per acre, by States, for a period of ten years. The States are placed in five groups, each group having a certain range of value, and distinguished both by mechanical drawing and by separate tints. As a prominent element in value, the yield per acre is shown in each State, in plain figures, in circles differentiated as in the illustration of value per acre.



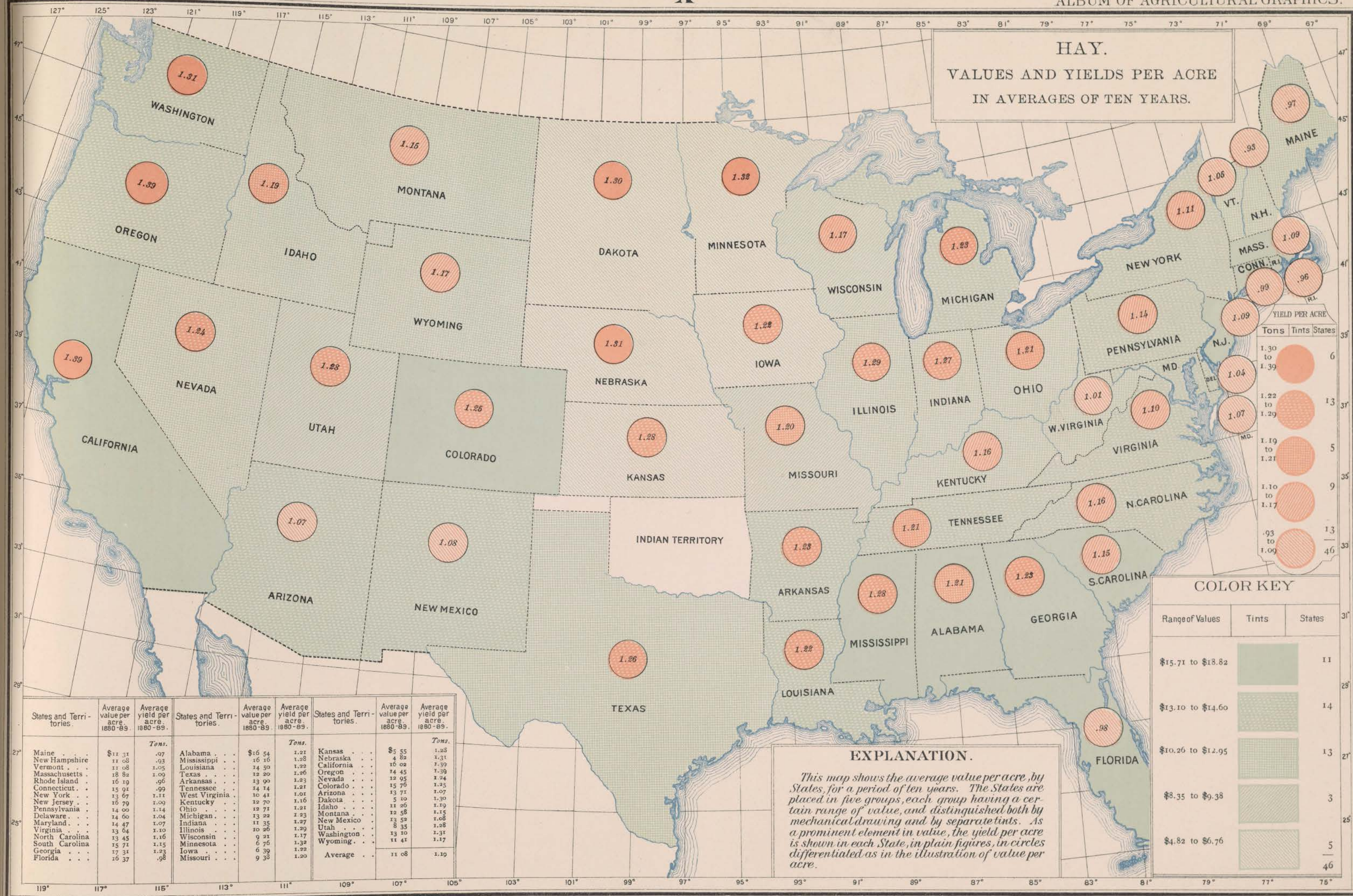




COTTON.  
VALUES AND YIELDS PER ACRE  
IN AVERAGES OF TEN YEARS.







States and Territories.	Average value per acre, 1880-89.	Average yield per acre, 1880-89.	States and Territories.	Average value per acre, 1880-89.	Average yield per acre, 1880-89.	States and Territories.	Average value per acre, 1880-89.	Average yield per acre, 1880-89.
Maine . . . . .	\$11.31	.07	Alabama . . . . .	\$16.54	1.21	Kansas . . . . .	\$5.55	1.25
New Hampshire . . . . .	11.08	.09	Mississippi . . . . .	16.16	1.28	Nebraska . . . . .	4.82	1.31
Vermont . . . . .	11.08	1.05	Louisiana . . . . .	14.50	1.26	California . . . . .	16.02	1.30
Massachusetts . . . . .	18.82	1.09	Texas . . . . .	13.00	1.25	Oregon . . . . .	14.45	1.39
Rhode Island . . . . .	16.19	.06	Arkansas . . . . .	13.00	1.23	Nevada . . . . .	12.95	1.24
Connecticut . . . . .	15.01	.09	Tennessee . . . . .	14.14	1.21	Colorado . . . . .	15.76	1.25
New York . . . . .	13.67	1.11	West Virginia . . . . .	10.41	1.01	Arizona . . . . .	13.71	1.07
New Jersey . . . . .	16.79	1.00	Kentucky . . . . .	12.70	1.16	Idaho . . . . .	5.10	1.30
Pennsylvania . . . . .	14.00	1.14	Ohio . . . . .	12.71	1.21	Dakota . . . . .	11.26	1.10
Delaware . . . . .	14.60	1.04	Michigan . . . . .	13.22	1.23	Montana . . . . .	12.58	1.15
Maryland . . . . .	14.47	1.07	Indiana . . . . .	11.35	1.27	New Mexico . . . . .	13.52	1.08
Virginia . . . . .	13.04	1.10	Illinois . . . . .	10.26	1.29	Utah . . . . .	8.35	1.28
North Carolina . . . . .	13.45	1.16	Wisconsin . . . . .	9.21	1.17	Washington . . . . .	13.10	1.31
South Carolina . . . . .	15.71	1.15	Minnesota . . . . .	6.76	1.32	Wyoming . . . . .	11.41	1.17
Georgia . . . . .	17.31	1.23	Iowa . . . . .	6.39	1.22			
Florida . . . . .	16.37	.98	Missouri . . . . .	9.38	1.20	Average . . . . .	11.08	1.19



